EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Stephen L. Keefe on 5/21/2010.

The application has been amended as follows (strike-through text is removed and underlined text is added):

Claim 1.   An image processing apparatus for estimating a motion of a <u>plurality of</u> predetermined feature ~~point~~ <u>points</u> of a 3D object from a motion picture of the 3D object taken by a monocular camera, comprising:

observation vector extracting means for extracting projected coordinates of the predetermined feature point onto an image plane, from each of frames of the motion picture;

3D model initializing means for making the observation vector extracting means extract from an initial frame of the motion picture, initial projected coordinates in a model coordinate arithmetic expression for calculation of model coordinates of the predetermined feature point on the basis of a first parameter, a second parameter, and the initial projected coordinates; and

motion estimating means for calculating estimates of state variables including a third parameter in a motion arithmetic expression for calculation of coordinates of the

predetermined feature point at a time of photography when a processed target frame of

the motion picture different from the initial frame was taken, from the model coordinates,

the first parameter, and the second parameter, and for outputting an output value about

the motion of the predetermined feature point on the basis of the second parameter

included in the estimates of the state variables,

wherein the model coordinate arithmetic expression is based on back projection

of the monocular camera, the first parameter is a parameter independent of a local

motion of a portion including the predetermined feature point, and the second parameter

is a parameter dependent on the local motion of the portion including the predetermined

feature point, and

wherein the motion estimating means:

calculates predicted values of the state variables at the time of photography

when the processed target frame was taken, based on a state transition model;

applies the initial projected coordinates, and the first parameter and the second

parameter included in the predicted values of the state variables, to the model

coordinate arithmetic expression to calculate estimates of the model coordinates at the

time of photography;

applies the third parameter in the predicted values of the state variables and the

estimates of the model coordinates to the motion arithmetic expression to calculate

estimates of coordinates of the predetermined feature point at the time of photography;

applies the estimates of the coordinates of the predetermined feature point to an

observation function using a perspective transformation based on an observation model

of the monocular camera to calculate estimates of an observation vector of the

predetermined feature point;

makes the observation vector extracting means extract the projected coordinates

of the predetermined feature point from the processed target frame, as the observation

vector; and

filters the predicted values of the state variables by use of the extracted

observation vector and the estimates of the observation vector to calculate estimates of

the state variables at the time of photography,

wherein each of the plurality of feature points represent each of a plurality of

parts of the 3D object and are used for determining a local motion of each part of the 3D

object when each part has different motion.

This application is in condition for allowance except for the presence of claims

11-22 and 30-40 nonelected without traverse. Accordingly, claims 11-22 and 30-40 are

canceled.

The following is an examiner's statement of reasons for allowance: Limitations

pertaining to "wherein each of the plurality of feature points represent each of a plurality

of parts of the 3D object and are used for determining a local motion of each part of the

3D object when each part has different motion", in conjunction with other limitations

present in the independent claim, distinguish over the prior art..

Any comments considered necessary by applicant must be submitted no later

than the payment of the issue fee and, to avoid processing delays, should preferably

accompany the issue fee. Such submissions should be clearly labeled "Comments on

Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to ATIBA O. FITZPATRICK whose telephone number is

(571)270-5255. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Samir A. Ahmed can be reached on (571)272-7413. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

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system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. O. F./
Examiner, Art Unit 2624

/Samir A. Ahmed/
Supervisory Patent Examiner, Art Unit 2624